

4-1-1945

## Farm Science Reporter Vol. 6 No. 2

*Iowa Agricultural Experiment Station*

*Iowa Agricultural Extension Service*

Follow this and additional works at: <http://lib.dr.iastate.edu/farmsciencereporter>



Part of the [Agriculture Commons](#)

---

### Recommended Citation

and (1945) "Farm Science Reporter Vol. 6 No. 2," *Farm Science Reporter*: Vol. 6 : No. 2 , Article 1.

Available at: <http://lib.dr.iastate.edu/farmsciencereporter/vol6/iss2/1>

This Article is brought to you for free and open access by the Iowa Agricultural and Home Economics Experiment Station Publications at Iowa State University Digital Repository. It has been accepted for inclusion in Farm Science Reporter by an authorized editor of Iowa State University Digital Repository. For more information, please contact [digirep@iastate.edu](mailto:digirep@iastate.edu).

MAY 30 1945

Per

# *Farm Science* **REPORTER**

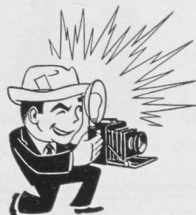
Vol. 6, No. 2

Iowa State College, Ames, Iowa

April, 1945







## The AUTHORS

**SELDON W. CAREY** is roadside improvement engineer for the Iowa State Highway Commission. Mr. Carey took his work at Iowa State College—2 years in engineering and 3 years in landscape

architecture. He was reared in Ames and has been on the Highway Commission staff since 1934.

**JEAN VIETH KLAS** is household equipment instructor in the Home Economics Division of Iowa State College. Mrs. Klas is one of the many women who has found a job to keep herself busy while her husband is in the military service. He is with (at this writing) the Third Army in Austria or Germany. Mrs. Klas finished her college training at Iowa State College in 1939. Her small daughter is in the college nursery school while she teaches.

**EMERSON W. BIRD**, research associate professor in dairy industry, Iowa Agricultural Experiment Station staff. His special field of research is dairy chemistry. Dr. Bird has been on the staff since 1923. He was born in Philadelphia, lived most of his boyhood days in New Jersey, attended college at Penn State. He did his graduate work at Iowa State College and received his doctor's degree under Dr. Hixon, head of plant chemistry and now head of the Chemistry Department at Iowa State College.

In addition to the important project which Dr. Bird reports in this issue of the Reporter, he has had two other very important projects. One of these is to determine the factors which affect fat losses in churning and the other is reduction of acid in buttermaking. He serves as consultant for some large dairy manufacturers in addition to his work at Iowa State College.

Other authors in this issue who have been previous contributors are: **R. A. NORTON**, soil conservationist, Soil Conservation Service, located at the Iowa Station. Mr. Norton is an agricultural engineer and works on problems of that field. **G. M. BROWNING**, Soil Conservation Service; **C. A. BOWER**, research assistant professor of soils at the Iowa Station; **MAURICE E. HEATH**, in charge of soil conservation nursery at Ames for Soil Conservation Service; **H. D. HUGHES**, head of farm crops at Iowa State College and Iowa Agricultural Experiment Station; **C. C. CULBERTSON**, chief of Animal Production Sub-section of the Iowa Agricultural Experiment Station; **J. B. DAVIDSON**, head of agricultural engineering at Iowa State College and Iowa Agricultural Experiment Station.

## Reprints of Reporter Articles

From the beginning, articles in the Farm Science Reporter have been planned to offer assistance for several years. Reprints of most of the articles have been obtained so that when the issue was out of print, or when someone wanted just one particular article, the reprint might be used.

Some of these reprints have gone out of print, too, but there are still reprints of many former articles available. If you recall some former article that you would like to read again, ask for it and it will be sent to you if it is available. Many of these reprints have in effect taken the place of short, popular bulletins.

A list of all publications (reprints from the Reporter and the Iowa Farm Economist in addition to bulletins) is available and will be sent to anyone who is interested. If you want your name on a mailing list to be notified of all new publications it will be added upon request. The bulletins won't be sent to you without a specific request, but you will be notified of new publications so that you may send for those that you want.

## Next Time We'll "Sod" Highways

Good roads are such an important asset to the farmer that we felt we were justified in giving some space concerning the building of them. Especially so since the story in this issue deals with the seeding down of shoulders, the prevention of washing. The engineers have found, too, that the way farm land is handled in fields adjoining the roads has much to do with the maintenance of roads in some areas.

Many county supervisors, too, are farmers and are thus directly concerned with road building and maintenance. Road work seems so much a farmer's problem as well as the engineer's that next month we are going to have another story which will discuss sodding down shoulders of newly built roads and drainage ditches.

If Iowa farmers understand the problems they can definitely lend a hand at least to the maintaining of highways. Cooperation between the engineers and farmers is essential.

## About the Vitamin A Butter Story

Although only Emerson W. Bird and the editor of the Reporter appear as authors of the article telling of the findings in the project dealing with vitamin A content of Iowa butter, some other members of the Iowa Agricultural Experiment Station staff need credit.

C. Y. Cannon and Dwight Espe of the dairy husbandry staff offered suggestions and gave some information on the angles dealing with the feeding of cows. This information did not come from the study. I. J. Johnson of the farm crops staff gave some information about the breeding of crops more potent in carotene—the plant pigment from which the cow manufactures the vitamin A she puts in her milk. Dr. Johnson did some work on this kind of plant breeding when he was a member of the Minnesota Agricultural Experiment Station staff.

## The Cover—Highway 169

The cover picture of this issue of the Farm Science Reporter is a view of a nicely grassed portion of the roadside of Highway 169. This photo was made by Maurice E. Heath of the Soil Conservation Service.

This photograph, taken south of Ogden, shows in the background the farmstead of Henry J. Meier of Bouton, Iowa. Mr. Meier's farm is on the county line—20 acres in Boone County and 93 acres in Dallas. The photo was made looking north.

Well grassed roadsides of this kind are being made now from seedings of alfalfa and brome grass in many parts of Iowa. This seed mixture does exceptionally well in north central Iowa.

## CONTENTS

	Page
Plows Testify Again . . . . .	3
Sow Down the Highway . . . . .	7
Streamline the Kitchen . . . . .	11
Iowa Butter Vitamin-Rich . . . . .	13
Lambs Put OK on Silage . . . . .	15
Pigs Vary in Gains and Feed Requirements	16

## FARM SCIENCE REPORTER

Editor: FRED E. FERGUSON

Art Director: SIDNEY H. HORN (on leave)

Editorial Advisory Board: R. H. Porter, chairman; Pearl P. Swanson; T. J. Maney; C. H. Van Vlack; Dwight L. Espe; Harold Gunder-son; John B. Peterson; and Carl Malone.

Published in January, April, July and October by the Iowa Agricultural Experiment Station and the Iowa Agricultural Extension Service.

Address all communications to Farm Science Reporter, Ag. Annex, Iowa State College, Ames, Iowa.

Cooperative Extension Work in Agriculture and Home Economics, Iowa State College of Agriculture and Mechanic Arts, and the United States Department of Agriculture cooperating. Extension Service, R. K. Bliss, director, Ames, Iowa. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. Agricultural Experiment Station, Iowa State College of Agriculture and Mechanic Arts, R. E. Buchanan, director, Ames, Iowa.

# PLOWS *Testify Again*

Compared With Disk, Lister, Subsurface Cultivator to Prepare Seedbed for Corn



On this terraced field of the Soil Conservation Experimental Farm in Page County, furrows are being thrown uphill to counteract the forces of soil erosion. This requires the use of a two-way plow. With this machine, the positions of back furrows and dead furrows can be controlled.

By R. A. NORTON, G. M. BROWNING,  
C. A. BOWER and J. B. DAVIDSON

**C**AN THE Corn Belt farmer prepare seedbeds for corn more cheaply without plowing and still produce as good a crop as he can by plowing? Many attempts have been made in past years to substitute lighter draft implements for the plow. Listing has been used in the Great Plains for many years. More recent attempts to stir the soil without turning it have given pretty good results in Nebraska and other states in the Wheat Belt. And during the past 2 or 3 years a scheme to discard plows entirely and prepare seedbeds with a disk harrow has received wide publicity.

During the summer of 1944, we continued our study of tillage methods on the same areas as reported last year (FARM SCIENCE REPORTER, January 1944), and in addition new studies were started on 10 cooperating

farmers' fields, representing five important soil types at different locations in Iowa. We shall need studies for several years before we can give unqualified approval to any change in methods, but from the studies to the present time we have drawn the following conclusions:

1. On unfertilized fields, corn yields from listing, disking and subsurface tillage were similar but averaged 8 to 10 bushels per acre less than from plowing.

2. On fertilized fields, listed corn outyielded that on plowed land by 1.3 bushels per acre. Yields from disking and subsurface tillage were similar but were 6 bushels per acre less than from listing.

3. The application of 200 pounds of 5-10-5 fertilizer per acre increased the yield on listed areas nearly 11 bushels per acre. It

improved the yields slightly on subsurface tilled plots and disked plots, but brought no increase on plowed areas. Yields on fertilized-listed, fertilized-plowed and unfertilized-plowed plots were about alike—considerably higher than for any other tillage treatment, fertilized or unfertilized.

4. Tillage practices definitely influenced the availability of plant food. Plants grown on soils which had been poorly managed in the past usually developed nitrogen or potash deficiencies, and yields of corn were reduced when seedbeds were prepared by disking or subsurface tillage.

5. Listing used less labor and power for growing the corn crop than any other method. This is particularly important now, with high costs and scarcity of farm labor.

6. Erosion control from listing on the contour was 16 times more effective; and subsurface tillage, with residues retained on the soil surface, three times more effective than plowing and surface planting.

The Iowa Agricultural Experiment Station and the Iowa State College Extension Service cooperated with the Soil Conservation Service and the district commissioners of several soil conservation districts in testing yields of corn on contoured fields where the seedbeds had been prepared by plowing, listing, subsurface tillage and disking.

## Lister-Planter and Subsurface Cultivator

All farmers have two of the implements used in these tests—the plow and the disk harrow.

The subsurface cultivator, almost unknown to Iowa farmers, has large sweeps—20 to 45 inches from heel to heel—which loosen the soil 4 to 6 inches deep without turning it over. All residues from the previous crop are left on the surface.

The lister-planter is common



only in southwestern Iowa and is used to open furrows 40 to 42 inches apart and to plant the seed in the bottom of each furrow. The lister bottom which opens these furrows is shaped like a plow with a double moldboard. Any residue remaining from the previous crop is rolled into the ridges between the furrows. Listed corn may develop rather slowly at first because the seed is placed in comparatively cool soil. This may not always prove to be a handicap. Sometimes a corn plant which has not developed vigorously above ground early in the season but has a deep, well developed root system can withstand drouth in mid-season and produce a good ear where a luxuriant stalk will suffer.

How can the hard-ground lister be used where corn is to follow a crop such as sweetclover or alfalfa? Some of the modern listers can prepare a satisfactory seedbed on such land. Subsurface tillage sweeps may be obtained to attach to the shanks of practically any of the older type hard-ground listers. By operating the sweeps 2 or 3 inches below the surface of sod land, growth of the plants will be checked, and then the hard-ground listing may be done in the usual manner.

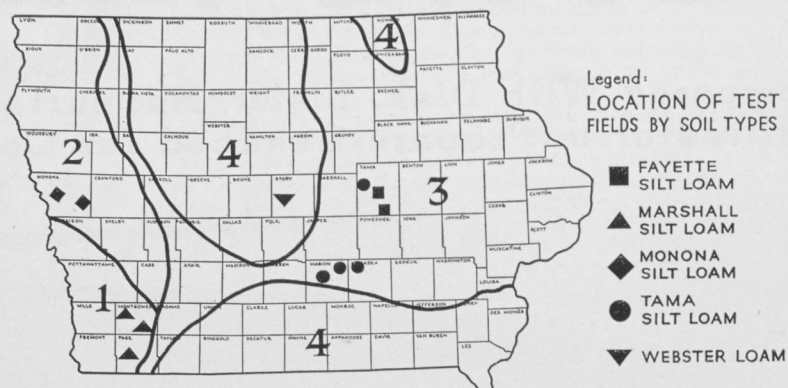
### Yields, Fertilizer Effects

Our tests on outlying farms in 1944 included eight contoured fields on four important soil series—Monona, Tama, Fayette and Webster. On the areas where no fertilizer was used (graph, p. 5), corn yields from listing, disking and subsurface tillage were all



Lister on contour, Earl L. Lyon farm, Toledo (Tama County). Throws up alternate ridges 42 inches apart. The planter attachment, not shown here, can be added for simultaneous planting. One trip completes task of preparing seedbed and planting.

## STATUS AND OUTLOOK FOR SIMPLIFIED TILLAGE PRACTICES FOR GROWTH OF CORN IN IOWA - 1944



GENERALIZED AREAS OF IOWA AND APPLICABILITY OF VARIOUS TILLAGE PRACTICES TO EACH:

1. Hard-ground listing commonly practiced.
2. Some listing done here now. Rapid expansion justified when new implements are available. Subsurface tillage and disking may have possibilities but commercial fertilizer may be necessary.
3. Little or no listing at present. Some soil types in this area have definite possibilities for listing if commercial fertilizer is used. Subsurface tillage will probably be satisfactory if the soil has been well managed. Disking works well following soybeans and possibly other crops when the soil has been well managed and is not compact.
4. Listing has less possibilities in these areas than elsewhere in the state. Disking has possibilities following crops that leave the soil loose.

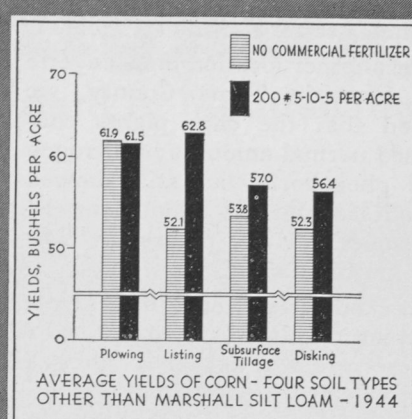
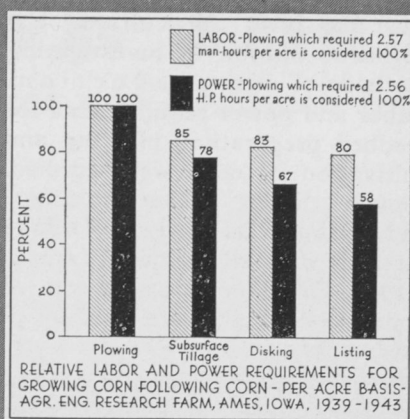
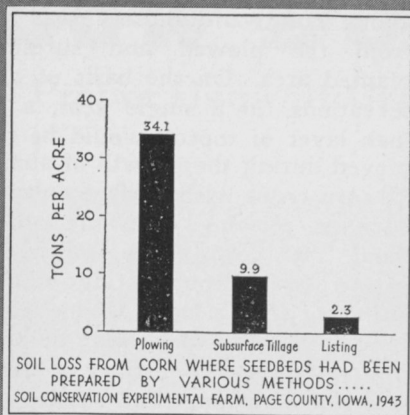
within 2 bushels per acre of each other but were 8 to 10 bushels less than from plowing. We observed that when the seedbed was prepared with the disk harrow or the subsurface cultivator, the corn plants in several fields were smaller, lighter green and yielded less than plants on plowed plots.

We found in the preliminary studies in 1943 that nitrogen and potash were often deficient where the land was not plowed. We also know (FARM SCIENCE REPORTER, July 1944) that the subsoil is often deficient in available nutrients and responds well to fertilizer. When corn is planted

with a lister the seedlings are at the bottom of a furrow in the cool and often unproductive subsoil. To see if commercial fertilizer would help overcome these difficulties, we applied 200 pounds per acre of 5-10-5 fertilizer to half of each test plot with a planter fertilizer attachment.

On the fertilized portions of the test plots, the yield on the listed plots increased 10.7 bushels per acre, but there was no increase from fertilizer where the seedbed was prepared by plowing. Fertilizer increased the yields 3 or 4 bushels per acre on the disked and the subsurface tilled areas. In other words, when fertilizer was used, the listed plots and the plowed plots yielded considerably better than those prepared by either subsurface tillage or disking.

The various tillage practices and the fertilizer did not act alike on all of the soils in various areas of Iowa. For recommendations with respect to different sections of the state see the accompanying map of Iowa. We'll now look at some of the results for southwestern Iowa where no fertilizer was applied.



## Marshall Soils Results

The Marshall silt loam is a permeable soil, well adapted to hard-ground listing. At the Soil Conservation Experimental Farm in Page County, the average yield of corn for a 3-year period, 1942-44, was: Plowed, 84.2 bushels per acre; hard-ground listed, 80.9; loose-ground listed, 70.6; and subsurface tilled, 65.3. These figures are the average of 10 separate fields on five different types of residues. Disking alone and a combination of subsurface tillage and disking were also included in the studies in 1944. The yields from these treatments were about the same as from subsurface tillage—17 to 20 bushels less than plowing. In general, hard-ground listing on the contour is advantageous on the Marshall soils as an aid to conservation of soil and water and, if considered over a period of time, would help maintain crop yields.

The loose-ground lister was included in the studies in Page County because this implement is commonly used in southwestern Iowa. It is simply a high-wheeled corn planter, each furrow opener equipped with a pair of 16-inch to 18-inch disks to open furrows which look much like those built with a hard-ground lister. The land must be plowed before this implement can be used, hence no advantage of power and labor saving is secured. We found that loose-ground listing gave yields 10.3 bushels per acre less than hard-ground listing.

## Tillage—Plant Food

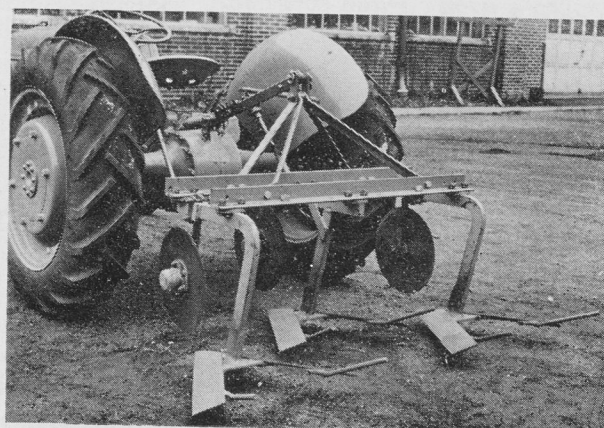
As mentioned before, we had observed in previous years that corn plants on some fields showed signs of too little plant food when the simpler tillage practices were used. To see what plant foods were lacking we determined the amount of nitrogen, phosphorus and potassium in plants taken from two fields where large differences in growth were observed just before tasseling time.

We found that plants grown on one field of Tama silt loam in Marion County contained the same amount of phosphorus and potassium under all tillage practices but that the percentage of nitrogen varied considerably. The plants from plowed areas contained 2.6 percent of nitrogen—about a normal amount—while those on subsurface tilled plots and disked plots had only about two-thirds as much. The soil of the plowed plots on July 12 contained 12 pounds of available nitrogen per acre in the plow layer, while only

3 pounds were found in the subsurface tilled and disked areas. The lack of nitrogen showed up in reduced plant growth—one-third as much on the subsurface tilled and disked areas as on the plowed. At harvest time we found yields as follows: Plowed, 56.1; listed, 42.9; subsurface tilled, 29.4; and disked, 40.9 bushels per acre.

Why was the available nitrogen in the subsurface tilled and disked plots low? We are not sure, but it probably is due to the more compact seedbed which did not provide enough air for rapid growth of soil microorganisms necessary to produce nitrates from organic matter. The plow loosened the soil more than the other tillage implements—the activity of the soil microorganisms was stepped up and more nitrate was produced. The plants on the listed plots did not show the characteristic nitrogen deficiency, as did the plants on the disked and the subsurface tilled plots, but they apparently did not get all the nutrients needed since 200 pounds per acre of 5-10-5

**Subsurface tiller.** Various sweeps offered to the farm trade range from 20 to 45 inches wide at the heel. The 3 sweeps shown here overlap, covering about 63 inches or about twice as much as a 2-bottom, 16-inch plow. Draft is lighter than a plow.





fertilizer increased the yields 17.3 bushels per acre—from 42.9 to 60.2.

At another location on a Fayette silt loam in Tama County, we found that the corn plants contained normal amounts of nitrogen and phosphorus but still showed definite symptoms of nutrient deficiencies. Here potassium was the limiting factor.

We didn't determine the nutrient content of plants on any field where growth appeared normal, but apparently plant food was deficient on several fields since the yields from disking and from subsurface tillage were lower than from plowing. On one field of Marshall silt loam, the plowed plots yielded 97 bushels per acre as compared to 69 for the subsurface tilled plots, a reduction of 28 bushels per acre.

Our studies to date indicate that tillage practices definitely influence the availability of plant food. In general, nutrient deficiencies develop and yields are lowered when the seedbed is not favorable for biological activity in the soil. It appears, therefore, that on soil of poor tilth it is especially important to use an implement that will mix and loosen the soil. Merely scratching the surface is not enough. We found that commercial fertilizers help to overcome nutrient deficiencies and increase yields, but they will not take the place of favorable soil tilth which is obtained when a legume meadow is included regularly in the rotation.

### Power, Labor Savings

For several years the Bureau of Plant Industry, Soils and Agri-

cultural Engineering cooperated with the Iowa Agricultural Experiment Station in investigating methods of corn production. Labor and power requirements for seedbed preparation, planting and cultivation of corn were studied. Plowing, listing, subsurface tillage and disking as primary tillage methods were all evaluated (graph, p. 5). Ordinary farm tractors of about 16-24 H.P. were used in all this work.

Note that when land is plowed for corn more labor and power are used than with any other method of seedbed preparation. If by adopting a new procedure a farmer can reduce his labor and power requirements, it may be to his advantage to grow his corn by some other than the established practice. In selecting such a practice he must be careful to consider the types of soil on his farm, and then choose a method which will not be likely to greatly reduce the yield.

### Lister Ridges, Residues Conserve Soil

Losses of soil and water from areas prepared for corn by various methods were determined at the Experimental Farm in Page County in 1943. The total precipitation during the observations was 30.11 inches. Data from this study are shown in the accompanying graph.

The residues retained on the soil surface were effective in breaking the erosive force of rain and thereby reduced soil loss. The ridges of the contour listed area were effective too in preventing soil loss. Likewise, water loss

from the listed area was only about one-twentieth as great as from the plowed and surface-planted area. On the basis of observations for a single year, a 6-inch layer of topsoil would be removed during the growth of about 25 corn crops with surface culture such as plowing. On the other hand, 380 corn crops might be grown by contour listing before suffering such a loss. Hence, contour listing should be very helpful in maintaining the fertility of erodible soil on a long-time basis.

### Other Problems

Anyone considering using any of the simplified tillage methods should keep a few precautions in mind.

The corn borer is an ever-increasing menace in Iowa. We have not had an opportunity to study the new tillage methods on areas badly infested with this pest. The corn borer spends the winter in cornstalks and other plants with coarse stems. Some of the methods leave the residue on the surface where it might harbor these insects.

We've had difficulty preparing seedbeds in heavy sods of alfalfa and sweetclover by disking or subsurface tillage. With the disk harrow, so many trips must be made to subdue the heavy growth that labor and power requirements become unnecessarily heavy, and the structural stability of the soil may be impaired. With the subsurface cultivator, there may be sufficient uncut roots just below the soil surface to keep the plants green if rains are frequent. Under such conditions the remaining plants compete with the young corn plants and interfere with cultivation.

In trials using cracked soybeans as the protein concentrate in comparison with linseed meal as the protein concentrate for dairy cows, no significant differences in the flavor of the milk were found in tests at the Iowa Station. The kind of container in which the milk was placed did not seem to affect the flavor regardless of the ration fed the cows.



Double-disking, using tandem-disk harrow to prepare seedbed for corn on Agricultural Engineering Research Farm, Ames. About three trips are required with this implement to prepare an average seedbed. Heavy sod may need so many trips that its use is uneconomical.

# Sow Down The Highway

Proper Uses Of Grasses and Legumes Important In Maintenance



This southern Iowa field, fall plowed, with no protection has created a difficult highway maintenance problem common in many areas of the state. The use of more grass and legume crops on contributing watersheds along with conservation practices such as contouring and terracing would do much to alleviate this problem. The soil carried down to the highway in this instance came off an 8-acre watershed area.

By MAURICE E. HEATH, SELDON W. CAREY and H. D. HUGHES

**G**OOD ROADS are a "must" to the Iowa farmer. Once they are built, how can we keep them from going to pieces because of washing—erosion? A big portion of the answer to that question appears to be sowing the right plants with the right methods on roadsides, cuts and fills to make the soil stay "put." Still more of the answer lies with the Iowa farmer, for his lands adjoining the highways if not properly farmed may help destroy the good roads he wants so badly.

Iowa today has 8,641 miles of primary roads, 92,924 miles of local and county roads, and in our right-of-ways we have about 716,000 acres of land. That's nearly as much land as in two average sized Iowa counties. It is on this area, excluding the roadbed, where adapted crops (grasses and legumes) need to be used in the road construction program to stabilize and protect the cuts, fills and roadside channels.

Some of the problems we find in highway maintenance where vegetative protection is inadequate are

(1) gullyng of road ditches on hillsides, (2) filling of road ditches by soil which has washed from the roadway watershed or from adjoining farmland, (3) rilling and gullyng of cuts and fills, (4) the filling of culverts and other structures with silt, (5) the undermining and undercutting of structures, (6) infestation of weeds and other related problems.

## Keep Soil, Water Home

In recent years the Iowa Highway Commission has made a start toward scientific studies of the roadside erosion problems. Some of the studies have been in cooperation with the Soil Conservation Service and the Iowa Agricultural Experiment Station. However, wartime conditions have reduced highway construction work since 1941 to almost zero. So the amount of carefully designed erosion control work has been limited. The results obtained, however, seem to justify the conclusions drawn and recommendations made here.

Adequate protective vegetation

of grasses and legumes for erosion control and stabilization should be a part of any road engineer's blueprint. The grasses produce a strong fibrous root system that holds the soil while the stems and leaves protect the surface. The legumes seeded with the grass furnish nitrogen—they feed the grass—stimulating growth on the less fertile soils found along cuts and fills. Erosion and vegetative problems, however small, can best be approached on a watershed basis. This entails conservation practices from the top of the watershed down. Such a program may consist of erosion control both on the highway and adjacent farmlands.

County soil conservation districts are encouraging farmers to keep their soil and water at home by using soil conservation practices such as putting the steeper slopes into permanent protective vegetation including improved permanent pastures, sowing larger acreages of grasses and legumes on cropland, terracing and contouring of row crops.



The county soil conservation district commissioners (elected by landowners of the district) of several counties have entered into an understanding with the county board of supervisors setting forth means in which they can work together to their mutual advantage.

In developing a well vegetated right-of-way, we have found that in addition to seeding of the grass-legume mixture, the use of mulches, stabilizing crops, soil treatments, sodded road and intercepting ditches are important in the revegetation program. These operations should be coordinated and conducted pretty much on a mile-to-mile basis as grading and completion of the job progresses. This will provide a maximum of protection for new construction by reducing the time between the finished grading operations and application of erosion control practices.

### Seeding Operations

It is important from the standpoint of establishing and maintaining vegetation that a mowable slope be constructed. This will aid materially in the prevention of sloughing and filling of ditches as well as allow for proper operation of equipment in preparing the seedbed and sowing the seed mixture.

A well stabilized roadside in Decatur County one year after seeding, sodding and mulching. Note the sodded channel. Red and alsike clover as shown above are well adapted to southern Iowa. Grasses included in the mixture used here were bromegrass, Kentucky bluegrass and redtop.



In general, all areas to be seeded should be prepared with a disk or spring-tooth harrow to loosen the surface soil 2 or 3 inches deep. On some subsoil areas it's necessary to use a scarifier to get a seedbed of proper depth.

After this operation, the stabilizing crop (oats or winter rye) may be sown and covered with a harrow followed by a cultipacker to firm the seedbed. The grass can then be sown broadcast and covered with a second rolling. Where there is considerable high-speed traffic, the shoulders should be rolled immediately to prevent air currents from scattering the seed.

The two best times to seed grasses are in the early spring (late March through May 30) and late summer or early fall (Aug. 15 to Oct. 1). On spring-seeded projects, the legumes should be sown with the grasses. On projects established in the fall we have obtained excellent results by sowing the legumes broadcast the following March when the soil surface is in a honeycombed condition.

### Species, Rate of Seeding

It is important that adapted grasses and legumes be used in all areas of the state. Bromegrass



Here's what happened to an Iowa road posed to wind and rain action. In the pictures below, sodding and mulching the slopes and sodding the two pictures below. Maintenance he

and Kentucky bluegrass seed are included in all of the mixtures except in the western two tiers of counties, where bluegrass is omitted. In north-central Iowa on the level to slightly rolling land, the mixture runs heavy to bromegrass (Achenbach, Lincoln and Fischer strains) and wilt-resistant alfalfa (Ladak, Cossack, Ranger and Buffalo strains). This is also true of western Iowa except that bluestem wheatgrass is included in the mixture for the more drouthy slopes in the western tier of counties.

In eastern and southern Iowa on acid soils the mixture includes redtop, orchardgrass and timothy along with red and alsike clover. We have found the vigorous, fast growing summer annual Korean lespedeza too competitive for the grass seedlings to be recommended in the mixtures on subsoil areas in southern Iowa. Reed canarygrass should be a part of the mixture where there are seepy or poorly drained areas.

With proper cultural practices, good grass and legume vegetative cover is being obtained with approximately 25 pounds of grasses and 15 pounds of legumes seeded per acre. When vegetative cover is not obtained with this rate of seeding, some factor other than rate of seeding usually is causing the thin stand or failure.



(Iowa) road which was left exposed. It can be prevented by seeding and mulching road ditch as shown in the other photograph. Erosion here obviously will be high.

### Stabilizing Crops

The stabilizing crops used are fast growing annuals or winter annuals that furnish quick protection to the roadsides while the perennial grasses are becoming established. The stabilizing crops also help greatly in holding the mulch in place as soon as the plants have grown through the straw. Do not allow the stabilizing crop to dominate the grasses and legumes during the growing season.

The stabilizing crops commonly used with satisfactory results are oats and winter rye. Oats are recommended for use in the fall after which they winterkill. This eliminates any competition with grasses and legumes the following spring and summer. The winter rye can be spring seeded and will furnish some early quick growth in the spring but won't grow vigorously later in the summer and will not compete seriously for moisture or offer too much shade for the grasses and legumes. We normally sow 1 bushel of winter rye per acre and  $1\frac{1}{2}$  bushels of oats.

### Fertility, Soil Treatments

If soil fertility is good and grasses and legumes can be established with comparative ease, soil treatments are unnecessary.

In southern and eastern Iowa,

on the infertile subsoil areas, commercial fertilizers including nitrogen and phosphorus (300 to 500 lbs. per acre of 10-8-6 and similar grades) have given good results in establishing grasses and legumes. Some of the sandy soils and soils formed under timber are especially low in calcium, and where possible, lime should be applied to aid legumes. The subsoil areas of the windblown soils in western Iowa have shown considerable response to nitrogenous fertilizers (150 to 250 lbs. per acre of ammonium nitrate) in establishing seedings.

Sometimes topsoil is salvaged and respread on the surface to be seeded. This practice aids greatly in obtaining successful grass establishment and we recommend it.

Straw manure has been found very beneficial in establishing grasses and legumes on subsoil cuts and fills. The manure has a stimulating effect and acts as a mulch, holding the seed in place and stabilizing the soil until the vegetation has become established. Straw manure could be used extensively by farmers and county supervisors on the local road system where vegetation is being established along roadsides.

### Use of Mulches

The value of straw, strawy manure, threshed timothy, hay, or other similar material for mulch

cannot be overemphasized when establishing protective vegetation on slopes along roadsides.

The value of surface protection by some type of cover to retard runoff and prevent excessive evaporation has been demonstrated in those areas where moisture often is a limiting factor. In Nebraska, it has been shown on a windblown soil (Marshall silt loam) that the intake of water on a bare cultivated soil—on the basis of a 5-hour duration—was only .21 of an inch per hour, while with the application of 2.5 tons of straw per acre, this soil was capable of absorbing 1.6 inches of water per hour or a total of 8 inches with no runoff. It also was demonstrated that 2 tons of straw applied to the surface was 40 percent more effective in conserving the rainfall than when the straw was disked into the soil.

We have tried various types of mulching materials on critical slopes. Those found most practical and economical were threshed timothy, strawy manure and oat, wheat and rye straw. In areas with high populations of chinch bugs, rye, wheat or barley straw should not be used for mulch because the volunteer plants encourage chinch bugs, which are very destructive to the young grass seedlings.

The "hay method" of establish-

A completed section of new highway construction. The slopes have been seeded and mulched and the road ditch sodded, thus providing immediate protection for new construction. Note that the slopes are so made that they can be easily mowed, thus aiding in proper vegetative maintenance.





ing desirable grasses such as brome grass has also proved very successful. The grass is allowed to head out and mature seed. Then the entire plant is mowed, dried and used for mulch on the new construction. The amount of seed spread per acre by this method usually is very high, and germination of the seed is spread over a long period.

We have found that mulches for best results should be applied at the rate of 3 to 4 tons per acre. This will provide for a mulch cover 3 to 4 straws deep. The mulch increases the capacity of the soil to absorb moisture. It also decreases evaporation and lowers the surface soil temperature during late spring and summer. This provides a much more favorable condition for grass seedlings to develop and usually spreads germination over a longer period.

Many observations have been

made in which the value of mulch has been compared with no mulch in holding the soil and seed in place. On cuts and fills with slopes varying from as steep as 2 to 1 to the more gentle slopes of 3 to 1, results show that the soil and seed losses are very heavy where no protective cover of mulch is used. We have lost from 50 to 90 percent of the grass and legume seed from such a slope by erosion where no mulch cover was used. The mowing hazards caused by severe rilling and gulying on unmulched slopes can largely be prevented with the proper use of mulch and other supplemental practices when establishing vegetation.

Only 6 soybeans strains out of 3,000 plant exploration introductions tested in Iowa during the 6-year period 1937 to 1942 were sufficiently promising to warrant further trial in 1943.

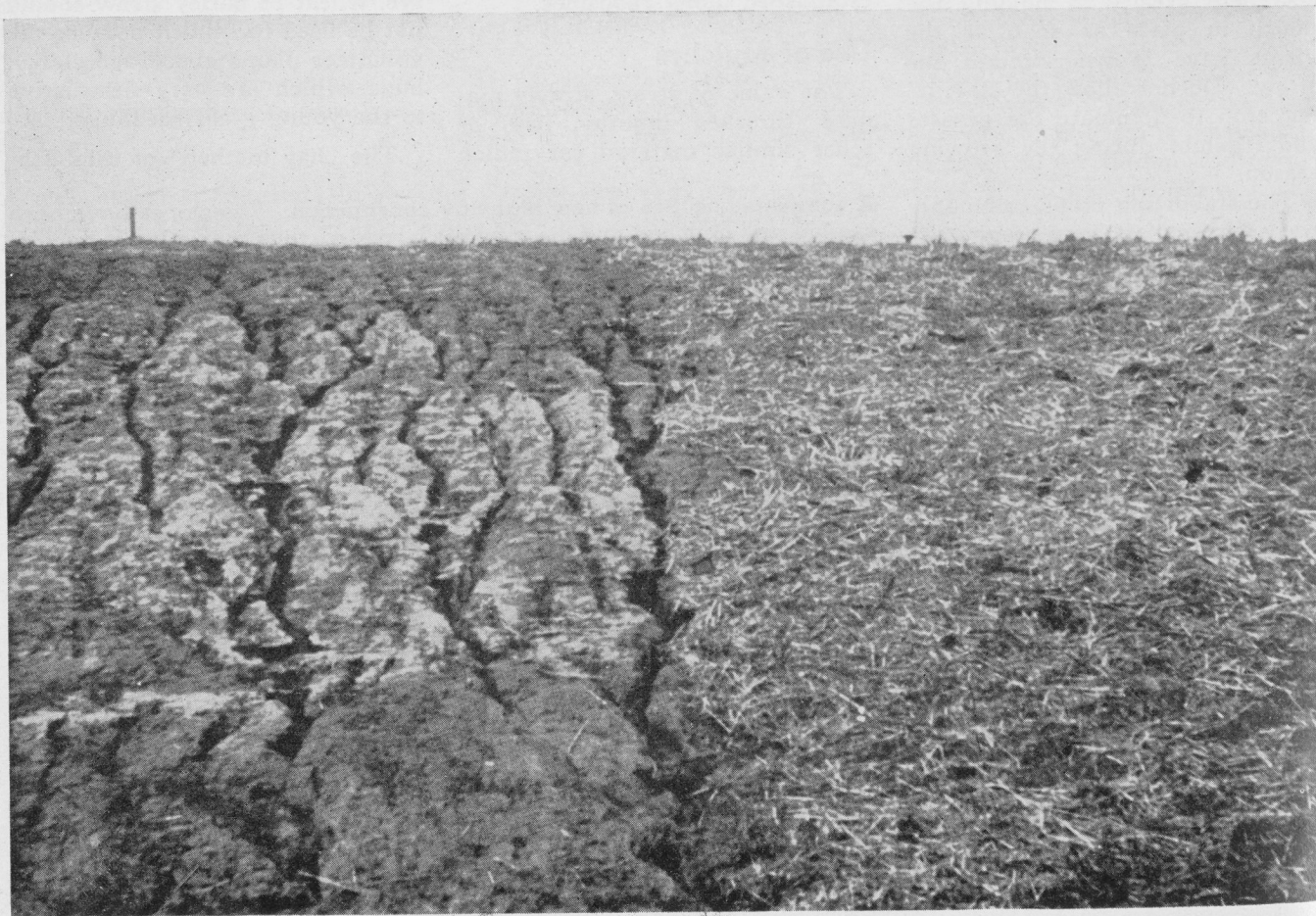
If one wants to produce a crop of medium red clover seed, then cut the first crop for hay in the bud stage, and the second one will then be most favored for seed production. That has been found in tests at the Iowa Station.

The lower the moisture content to which whole eggs are dried, the longer they will keep, tests at the Iowa Station have shown. At ordinary temperatures dried eggs of 2 percent moisture will keep 10 to 12 months as compared with 4 to 6 months for eggs dried to 5 percent moisture.

The great expansion of egg drying during the war has given this study much importance.

The commercial production of penicillin represents an entirely new industry, based on agricultural products, that was not even in existence 2 years ago.

Mulching is an essential practice in the establishing of vegetation on all highway slopes. Left: No mulch was used here on this 2 to 1 slope. Within 30 days after seeding, 90 percent of the seed was lost and severe gullying had taken place. Right: Straw mulch was used here at the rate of 3 to 4 straws deep. No soil or seed loss could be observed. The benefits derived from mulch are prevention of seed and soil loss, increased moisture infiltration, protection of young grass and legume seedlings from hot sun and wind and moisture conservation.



# Streamline The Kitchen

By JEAN VIETH KLAS

**W**ITH AN EYE to postwar remodeling, the average Mrs. Homemaker casts the other eye upon her kitchen as the first room for improvements.

First and foremost, she'll plan for efficiency—getting the job done in the least amount of time with the least amount of energy—that's good home management. Which means that such equipment as the range and refrigerator must be placed before the accessories can follow.

Her major kitchen activities—food preparation, cooking, serving and clearing up—center around the refrigerator, range and sink. This equipment should be placed so the preparation of food can flow along in a simple direct route from the time it enters the kitchen until it is served at the table.

## Lessen "Stepping"

Some of the roomy farm kitchens that keep Mrs. Homemaker "stepping" need to be rearranged to put the working units closer together. A really attractive way to shorten such a kitchen is by building a half-wall, about 3 or 4 feet high and 6 to 12 inches deep, extending from one wall perhaps 4 or 5 feet into the room. With this arrangement, she can group her equipment into a U-shape, which is considered a most efficient type of arrangement. The space cut off by the wall she could use as a breakfast nook. The top of the half-wall might be used for "counter service." Or perhaps the children might use the space on the other side of the half-wall for their playroom where Mrs. Homemaker can keep an eye on their activities. Shelves or cupboards could be built in the half-wall for their playthings. Another use would be as a sewing room or even a laundry room. Two short walls on either side of the room can make the same arrangement leav-



In the kitchen above is an idea for cutting down the size of the rambling farm kitchen—a built-in half-wall extending into the room. The equipment can then be grouped into a step-saving arrangement. Here the portion sliced off by the half-wall serves as a breakfast nook. Note the ample working surfaces built on each side of the sink and the range.

ing a "gate" opening from kitchen to dinette.

Before these shortening devices can be used, however, the structural room plan must be taken into consideration. Five doors and three windows in the kitchen certainly allow no wall space for convenient working areas. Are all the doors necessary? Couldn't one or two be blocked out and the family traffic rerouted? Too often the kitchen serves as a hallway from the back door to the rest of the house. If the kitchen is too large anyway, perhaps part of it could be walled off for a rear hallway, thus avoiding pre-dinner confusion in the kitchen when the family answers the mealtime calls.

## Sewing, Laundering Too

Kitchens, to be most pleasant and well lighted, should have two outside walls. Now, if Mrs. Homemaker's pantry should be on one of the outside walls, it may be stealing the possible light. If the storage space isn't needed, why not take the old fashioned pantry out? On the other hand, if the pantry is not obstructing light or other conveniences of the kitchen, it could be turned into a storage

space for the washing machine and other laundry equipment. Or the sewing machine and its accessories could be kept there. Tiny pantries sometimes can be taken over as the cleaning closet for mop and broom, sweeper and dust cloth. With plumbing, the pantry could become a washroom, handy for the men in for dinner.

The idea of laundering in the light of day rather than underground, basement style, is being stressed today. In fact, most of the former basement duties are coming up with the rest of the family work. The milk separator, the men's washroom and a place for their work wraps and boots, a household tool chest—these could all be brought up from below. It would save time and many steps for Mrs. Homemaker if she had a utility room near the kitchen on the ground floor specially designed for these basement duties. And this may be an idea for remodeling the spacious kitchen—cut it into two separate rooms.

Then again, the room Mrs. Homemaker is using for a kitchen today may not be the most convenient room to use. If she would study the entire house plan, perhaps she would find that a down-





stairs bedroom would be more convenient, or maybe the dining room, depending, of course, on the necessary plumbing and structural changes.

In placing her equipment, Mrs. Homemaker should keep in mind a few simple rules—one is that all work should proceed from right to left. So the refrigerator being the first stopover for food should be close to the back entry. To the left of the refrigerator should be the preparation center, the sink and work space. Then again, to the left, the stove. Since cooking is the last step before serving, the range should be close to the dining room door with a service table handy. A fuel box covered with linoleum could be used as a utility table.

### In-Betweens Are Bugbears

Since Mrs. Homemaker buys her three main work centers, the range, refrigerator and sink, they are usually efficiently designed, but the bugbear of her kitchen is the "in-between"—the cupboards, cabinets, storage places.

The best way to have an ideal kitchen cupboard arrangement is for Mrs. Homemaker to sketch the shelves and drawers to fit the equipment she has on hand and according to the tasks she has to do. Then she can give this rough layout to the carpenter or take it with her if she's buying a ready-made unit.

In planning her cupboards she'll profit by past experiences. Practicality will be her motto and efficiency her goal. For instance little things like handles for drawers and cupboard doors. They needn't be centered on the space—she can place them where they are most convenient to reach. For

Again the half-wall idea, only this time extending from either wall to form a gateway from kitchen to dinette. Kitchen equipment is arranged so that work proceeds from right to left—from refrigerator to sink to range.

ease in standing close to the cabinets to work, she must allow toe space at the base. Cabinets built to the ceiling collect less dust and she can store seldom

used articles in the top shelves.

### Four Storage Units

If Mrs. Homemaker takes tally of the part her cabinet plays in the kitchen, she'll find it usually can be divided into four units: one for mixing, one for china storage, one for storing cooking utensils and the storage space in connection with the sink.

The mixing unit is devoted to the preparation of foods. Here sugar and spice, flour and extracts are stored. And by their side, the mixing bowls, measuring spoons, measuring cups, rolling pin and whatever else it takes to mix up a cake, pie or bread. Here Mrs. Homemaker can plan the storage spaces to fit her equipment. She can use adjustable shelves that may be placed close together for the baking cups and moulds or farther apart for tall articles. Some of the shelves needn't extend the full length of the cupboards, leaving space at the end for tall pitchers, jars and bottles. Too, in the mixing unit, she might plan for a lap board which pulls out of the cupboard in the same manner as the bread board, only at a height to allow Mrs. Homemaker to sit as she uses it.

The short spice cans seem to cause her the most "searching" problems. To avoid this, she could build stair-stepped shelves in her cupboard then allow only one row of spice cans per step. Then each one would be visible at a glance. Or spice racks on the inside of doors would be another solution. Shallow cupboards, about 6 inches deep, are handy for spice storage.

Sliding shelves used in the lower part of the cabinets would put her equipment within easy reach. She

should also plan a section with horizontal or vertical, removable partitions for storing trays, baking sheets, muffin tins or platters.

As for the china storage unit, she should place it at the left of the sink, if possible, so as the dishes are dried they may be passed from right to left. Tall stacks of dishes are likely to cause breakage—shelves should be close together. Here again, shelves built only one half the length of the cupboards may serve the purpose of leaving room for tall pitchers or glasses. Adjustable shelves would be best.

Mrs. Homemaker's cooking utensils should be stored where they're easily accessible to both the range and the sink. She can plan for vertical sliding drawers in one part of the cabinet section where stew pans and skillets could be hung, thus eliminating the stacking system.

She can utilize the space below the sink, too. Soap, cleansers, dishpans and the garbage pail could be kept there. Tea towels, too, could disappear under the sink on a sliding towel rack or a sink drawer with a false bottom of towel rods. She should have perforations in the door of the sink cabinet to allow ventilation.

### Specialties

Now that Mrs. Homemaker has a good start at planning the material needs of her kitchen, she can add those specialties important to her everyday life. For instance, a radio. The news, music or her favorite radio serial brought into the kitchen can brighten her day. The telephone—how much more handy it would be on her kitchen desk when Mrs. Jones called "in the middle of a cake." A bulletin board—calendars and dates could be posted. A high kitchen stool with ladder combination—the latter's a means to the loftiest cupboard. Of course, she expects to have drawers in her desk or some other filing arrangement for her recipes.

# IOWA BUTTER

## *Vitamin-Rich*

By EMERSON W. BIRD and FRED E. FERGUSON

**F**OLKS WHO eat Iowa butter in generous amounts are rather sure to be getting a great deal of that important vitamin—vitamin A.

This is shown by the first year of a 2-year study under way at the Iowa Station—part of a national survey now in progress. The study reveals that in almost any month, from any part of Iowa, you can depend on Iowa butter having not less than the 9,000 international units per pound which has at times been considered an average vitamin A content of butter. In the best months of the year, Iowa butter has shown over twice this amount.

The vitamin A value is found in butter not solely as vitamin A, but also as beta-carotene which the human body can change into vitamin A. The carotene is a plant pigment which gives most of the yellow color to the fat of cows' milk and which is more noticeable in milk and butter produced when cows are on green pasture or good green, leafy hay than when they are on dry grain rations with poor hay.

### Varies With Season

The vitamin A value varies with the season, our study here at the Iowa Station has shown. The butter richest in vitamin A during the first year of our study was produced during July, August and September when the potency ran from 16,500 to 21,400 international units per pound of butter. That's about twice what was formerly

considered a good average value. The vitamin A value was moderately high during May, June, October and November, then dropped sharply from November to January and was lowest during January, February, March and April. (See accompanying chart.)

One of the interesting and important things to note in this rise and fall in vitamin A values is that they are highest during some of the months when the most butter is made and stored. The bulk of the storage butter is produced in May, June and July.

This study should point to the need on the part of dairymen of trying to correct the fall in vitamin value during the winter months. The cow produces vitamin A from the orange-colored pigments (chiefly alpha-, beta-, and gamma-carotenes) of plants. Some of these carotenes the cow turns into vitamin A for her own use and part of them she passes on in her milk either as vitamin A or as beta-carotene. Then when the cream is skimmed from the milk, the vitamin A and carotene go with the cream and end up in butter when the cream is churned.

When cows are on green pasture, milk and the butter produced normally have a yellower color and are higher in vitamin value. But yellow colored milk doesn't necessarily indicate higher vitamin A value. Guernsey cows, for example, pass about two-thirds of the vitamin value into their milk as carotene rather

than converting it into colorless vitamin A. About half the vitamin value from Jersey milk is in the form of carotene and the other half vitamin A, while breeds such as Holsteins and Ayrshires pass only about a third of their vitamin A on as carotene and the other two-thirds as vitamin A. So the color of milk alone is not a sure indication of whether it is rich in vitamin A.

### The Vitamin Measure

Vitamin A value is measured in micrograms and these are expressed in the term international units, commonly abbreviated as I.U. While the value of both carotene and vitamin A are expressed in the term international units, in a given weight of each, vitamin A has more international units. To convert vitamin A into international units, each microgram is multiplied by a figure tentatively fixed at 4, and each microgram of beta-carotene is multiplied by 1.67. Then by adding together the values for each, the total international unit value is determined.

You may wonder, "How much is a microgram?" It is equal to  $1/28,350,000$  of an ounce! Not very heavy. But when you consider that each one of these tiny weights yields 4 I.U.'s in vitamin A then you can see that an ounce of this material would really provide many people with what is considered the average need of 5,000 international units for each person per day.

For this study the state was divided into seven areas as shown in the accompanying map of Iowa. Into each area were grouped the creameries that were producing butter of about equal grade or score. No one has ever shown that there is any connection between score and vitamin A po-



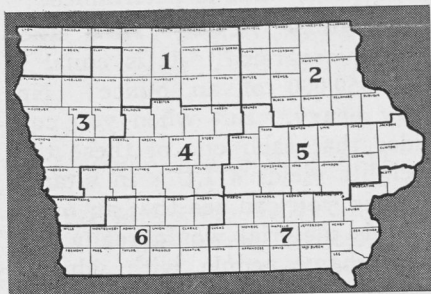
During the months when cows were getting green pasture grass Iowa butter showed its highest vitamin A value. Values were lowest in January, February, March, April.



tency, but this means of dividing the state did provide a method of getting similar areas and creameries together to give a representative sample. By getting butter from each area, then, an over-all picture for the state was obtained.

The number of creameries which were drawn for each area was in accord with the production of butter for that area. In other words, an area producing much butter would have more creameries providing samples. The whole attempt was to try to get a fair view of vitamin A value in Iowa butter.

Those in charge of the study concluded that 60 creameries furnishing samples of butter once each month would be about the number that could be handled satisfactorily. These creameries were then selected from each area by a random sampling method (random sampling may be likened to drawing names or numbers from a hat when all of the names or numbers are in the hat—each has as good a chance to be drawn as another).



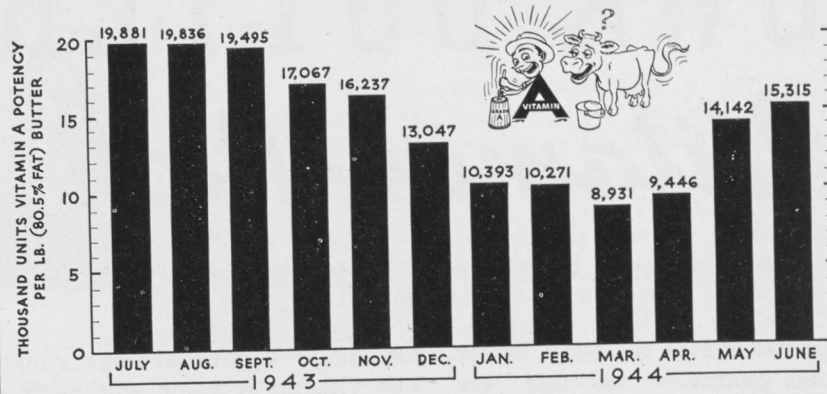
Iowa was divided on a butter score basis into seven districts for the study of vitamin A value of butter.

The sampling method used seemed to give a fairly representative picture of the vitamin A value of Iowa butter. The second year's results of the study are not yet available, but they are expected to correspond fairly well with the first. It might be that the vitamin A value will rise at an earlier period than in the first year because pastures got off to an earlier start this spring.

### Need for More Study

This report is concerned chiefly with the vitamin A value of Iowa butter, but it does clearly

International Units OF VITAMIN A POTENCY PER LB. IOWA BUTTER  
JULY, 1943 to JUNE, 1944



point to some avenues of study and to some things which dairymen may well be thinking about. First, can Iowa dairymen "lift" the vitamin value of butter that comes from Iowa during the non-pasture season?

Experiment stations have shown, and it is fairly generally known, that the way hay is cured has much to do with how much of its vitamin value is preserved or lost. We also know that the leaves of hay are much higher in vitamin value than the stems. So we need to do much thinking about the way we cure our hay to preserve the leaves and to prevent the hay from severe weathering.

A new project is being started at the Iowa Station on artificial drying of hay in the mow. Other stations have done some work on this problem and are continuing their study of the best way to get the hay cured so that it will have the highest possible feeding value—and that includes its value for production of vitamin A in the fat of the dairy cow. Turning crops into silage may be a partial answer to preserving the vitamin A material—the carotene.

This whole problem of increasing the vitamin content of butter in the winter months, early spring and late fall when cows are not on pasture is one for the dairy husbandry men to work on. Some work has been done and much more no doubt will be after the war.

Another problem which offers a promising avenue of research is to find or develop varieties, lines and strains of crops which are high in

carotene. Some work has been done on this here at the Iowa Station and at other experiment stations. It has been shown that strains and lines of corn, grass and other crops do differ a great deal in their carotene content. The plant breeder's job is to try to bring high carotene content together with good yielding ability and other desirable qualities.

### Conclusion

This study has shown to date that Iowa butter is a rich source of vitamin A. This agrees with the long accepted fact that butter is the natural food with the highest vitamin A value. The study indicates the need for more research on winter feeding of our dairy herds to see what can be done to increase vitamin A in Iowa winter butter to make it more nearly reach the very high value it has during the pasture months.

Various hybridization studies are under way at the Iowa and other experiment stations in trying to produce superior soybean varieties. One of these crosses between Richland and Mukden seems rather promising.

In 1943 in 17 locations in 9 states, this cross yielded about the same as Lincoln, which has been superior to any other variety with which it has been compared. In addition, this new cross in 1943 matured about 7 days earlier than Lincoln and was slightly superior to Richland in lodging resistance, a thing for which Richland is particularly prized. This new cross was high in oil content too.

# LAMBS Put *OK* On SILAGE

## Those Fed Silage Gave Best Returns Over Feed Cost and Gained Fastest of 6 Lots

By C. C. CULBERTSON and FRED E. FERGUSON

**I**N LAMB feeding trials here at Iowa Station during the past winter, we had two main objectives in mind: (1) To find whether it would pay to feed lambs corn silage and alfalfa hay instead of hay and (2) whether one can and should push lambs up to a good feed of shelled corn and hold them at that level, or whether the amount of corn should be shifted from time to time in accordance with the appetite of the lambs to keep them on full feed.

The feeding tests of 100 days, gave these results:

1. The best margin over feed cost was obtained from the two lots of lambs which were given a full feed of corn silage in the morning and alfalfa hay at night, together with a full feed of shelled corn, 0.2 pound of soybean oilmeal per lamb daily, a simple mineral mixture and salt self-fed.
2. It paid this past winter to full-feed shelled corn rather than to limit the corn and hold the lambs at that level.
3. It was highly profitable to feed silage. The silage was charged to the lambs at \$8 a ton, but it displaced enough other feed so that its actual feeding value was about \$14 a ton.
4. All six lots of lambs showed a good margin over feed cost.

This ranged from \$1.95 to \$3.55 per lamb for the 100-day feeding period.

### Description of Lambs

White-faced Montana lambs were used. They weighed an average of 74 pounds each when the feeding started December 12. The lambs were divided into 6 lots of 50 lambs each. These were fed for 100 days, and at the end of the feeding period were sold and slaughtered in Des Moines.

The lambs cost an average of \$13.57 per hundred in the feedlots at Ames. This included the freight, cost of feeding the lambs and handling from the date purchased up to the time the feeding began.

These lambs proved to be rather light corn eaters, inasmuch as the daily consumption of corn never exceeded 1.75 pounds. The two lots which were full-fed on corn and hay ate an average of 2.37 bushels each per lamb during the 100-day feeding period.

The silage used in these tests had approximately 15 percent of corn in it.

### The Lambs on Silage

In this feeding experiment there were three series of two lots each. Lots 1 and 2 were fed corn silage in the morning—all they would eat after they had been given as much shelled corn as they would clean up in about 20 minutes. On top of the silage they were given 0.2 pound of soybean oilmeal per lamb daily. Then they were given a full feed of shelled corn again in the evening and what alfalfa hay they would eat. They also had a simple mineral mixture made up of 70 pounds finely ground limestone and 30 pounds special bone meal. This was fed over the silage at the rate of  $\frac{1}{4}$  ounce daily per lamb. Block salt was kept before them all of the time.

On this ration, Lots 1 and 2 showed the largest margin over feed cost of any of the lots. They averaged \$3.39 and \$3.55 per lamb when sold. They were well finished and when the carcasses were graded after they had been slaughtered, each of the lots had 47 grade AA carcasses and 3 grade A. These two lots were very close in all respects—amount of gain, feed consumption, selling price and margin. They were appraised on foot at a difference of 10 cents a hundred; feed cost for 100 pounds of gain differed another 16 cents.

The two lots of lambs below were the highest in margin over feed cost of the six lots fed. Those at the left were full-fed shelled corn and silage, while those at the right were full-fed shelled corn and alfalfa hay. Those on silage made the most rapid gains, had the highest margin.





Average Daily Gain, Amount of Feed, Feed Cost, Selling Price, Margin Per Lamb Over Feed Cost, Dressing Percentage, Carcass Grade—1944-45 Experiment.

LOT NO.	Full-fed corn, corn silage, alfalfa hay, soybean oilmeal, minerals and salt		Full-fed corn, no silage, hay, soybean oilmeal and salt		Try to hold steady at near full feed of corn, alfalfa hay, soybean oilmeal, salt	
	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5	Lot 6
Av. daily gain per lamb	0.41 lb.	0.41 lb.	0.37 lb.	0.38 lb.	0.36 lb.	0.36 lb.
Cost of feed per 100 lbs. gain	\$10.06	\$ 9.90	\$11.17	\$11.00	\$11.24	\$11.15
Selling price per cwt. at end of 100 days feeding	15.90	16.00	15.50	16.10	15.10	15.85
Margin per lamb over feed cost	3.39	3.55	2.48	3.24	1.95	2.86
Dressing percentage	47.4%	48%	48%	47.7%	46.9%	46.6%
Carcass grade	47 AA, 3 A	47 AA, 3 A	46 AA, 4 A	46 AA, 4 A	41 AA, 8 A	34 AA, 9 A, 1 B
Amount of feed per 100 lbs. gain:						
Shelled corn*	296 lbs.	292 lbs.	357 lbs.	351 lbs.	311 lbs.	312 lbs.
Soybean oilmeal	49	48	27	26	28	28
Silage	362	358	.....	.....	.....	.....
Alfalfa hay	179	175	398	393	484	472
Minerals	4	4	.....	.....	.....	.....

\*All corn reduced to 14% moisture.

It so happened that the lots appraised at the higher price also made their gains at the lowest cost.

### Lambs on Hay—No Silage

Lots 3 and 4 were fed the same as Lots 1 and 2 except that they got no corn silage, but instead were fed hay twice a day, only half as much soybean oilmeal and none of the mineral mixture.

The returns from these lots over feed cost were next best to the lots on corn silage. The margins over feed cost for the two lots were \$2.48 and \$3.24 per lamb. The cost of feed for 100 pounds of gain differed only 17 cents, but the selling price was 60 cents higher for Lot 4 than for 3. When the lambs were slaughtered the carcass grades of the two lots were exactly the same—each had 46 lambs with AA grade and 4 with grade A.

### Need to Watch Corn

In our Lots 5 and 6, fed the same as Lots 3 and 4 except for shelled corn, we were trying to see whether or not it would be good procedure to get the lambs onto a good feed of corn—about what might be near full feed—and then hold them steadily at that same feed. We found, however, when we got the lambs up to 1½ pounds a day per lamb and tried to hold them there that the light eaters

held back and were not cleaning up the corn. Then the heavier eaters gorged themselves on corn, and as a result we lost two lambs.

We then dropped these lots back to 1¼ pounds a day and held them at that rate to the end of the feeding period. We were able to keep them on feed at that level, but these lots did not gain quite as fast as the silage lots and the other two lots on hay and a full feed of corn.

These two lots ate more hay than the others, but less corn. The cost of feed for 100 pounds of gain was slightly the highest and the margin over feed cost the lowest. The grade of the carcasses of lambs from these lots was not quite as good as the other four lots.

### Price of Feed

The price of feed used for these lots of lambs was figured as follows: Shelled corn (14 percent moisture) \$1 per bushel; silage \$8 per ton; alfalfa hay \$20 per ton; minerals \$25 per ton; and salt \$20 per ton.

The detailed results of the feeding trials are presented in the accompanying table.

On the whole, the feeding of lambs during the past year showed a fairly good margin over feed cost. These tests indicate that either the use of silage or alfalfa hay with a full feed of shelled corn

will produce satisfactory gains and margin over feed cost with the prices of feed and of lambs the past winter.

## Pigs Vary In Gains and Feed Requirements

You can breed pigs for more rapid gains and lower feed requirements per hundred of gain.

During 1944 comparisons were made at the Iowa Agricultural Experiment Station of the rapidity of gains of 9 of the 12 lines of Poland Chinas being carried in the swine breeding program and from the single line of Danish Landrace.

Results of these comparisons showed the pigs varied in gains from 0.94 pound per pig daily to 1.46—some of the lines gaining nearly a half faster than others. This test was made by selecting four pigs from each sire progeny, the four being selected from one to four litters. Eleven of the groups were cross-line, that is, the sire and dam were from different inbred lines.

The amount of feed required to put on 100 pounds of gain varied in the Poland Chinas from 403 to 526 pounds. The average for the Poland Chinas was 452 pounds. For the Danish Landrace line the amount of feed required was 427 pounds and the daily gain 1.23 pounds per pig daily.